

UEA Contribution 1 to D9

UK observed changes in extremes 1960-2000

Malcolm Haylock, UEA – November 2003

Rainfall

27 stations in SE England and 13 stations in NW England were analysed with the STARDEX diagnostic extremes software to determine changes in extreme rainfall over the period 1960-2000.

The following parameters were used:

rainday threshold = 1mm

base period for calculation of normals = 1961-1990

Minimum no. of raindays for percentile calculation = 10

minimum non-missing data = 80%

In general extreme rainfall in both regions has increased in DJF and decreased in JJA. Changes are stronger in DJF than JJA.

prec90p: 90th percentile of raindays

Generally this has increased in DJF and decreased in JJA by up to 0.23 mm/yr. In both seasons only 3 stations show a (very weak) trend of the opposite sign. Fig 1 shows the DJF trends.

641CDD: maximum consecutive dry days

Generally this has decreased in DJF (up to 0.16 days/yr) and increased in JJA (up to 0.24 days/yr). A coherent region of about 12 stations in the far SE shows an increase in DJF. In JJA, changes are generally stronger in the SE compared to the NW.

644R5d: maximum 5-day rainfall total

Consistent with prec90p, 5-day rainfall has generally increased in DJF (up to 1.1 mm/yr) and decreased in JJA (up to 0.75 mm/yr).

SDII: Simple daily intensity index (rain per rainday)

In DJF this has increased at all stations except one by up to 0.08 mm. In JJA 33 of the 40 stations show a decrease of up to 0.05 mm.

691R90T: proportion of total rainfall from events above the 1961-1990 90th percentile

Generally this has increased in DJF and decreased in JJA by up to 0.7 %/yr

692R90N: no. of events above the 1961-1990 90th percentile

Generally this has increased in DJF (up to 0.14 events/yr) and decreased in JJA (up to 0.08 events/yr).

Temperature

The STARDEX diagnostics software was run with 21 temperature stations (from the FIC European data set) over the period 1958-2000. Parameters were set as for rainfall. A strong warming over the period reflects in all the indices.

tmax90p: 90th percentile of maximum temperature

This has increased at all stations in both DJF (up to 0.04 deg/yr) and JJA (up to 0.06 deg/yr).

Tmin10p: 10th percentile of minimum temperature

This has increased at all stations in DJF (up to 0.07 deg/yr) and increased at all stations except 2 in JJA (up to 0.04 deg/yr). One station (Askham Bryan) in JJA shows a strong decrease (-0.03 deg/yr).

125Fd: Frost days

This has decreased at all stations in DJF (up to 0.5 days/yr). In JJA less than half the stations have cold enough temperatures with very small trends.

144HWDI: Heat wave duration index

This has increased at all stations in DJF (up to 0.05 days/yr) and increased at all except 2 stations in JJA (up to 0.1 days/yr).

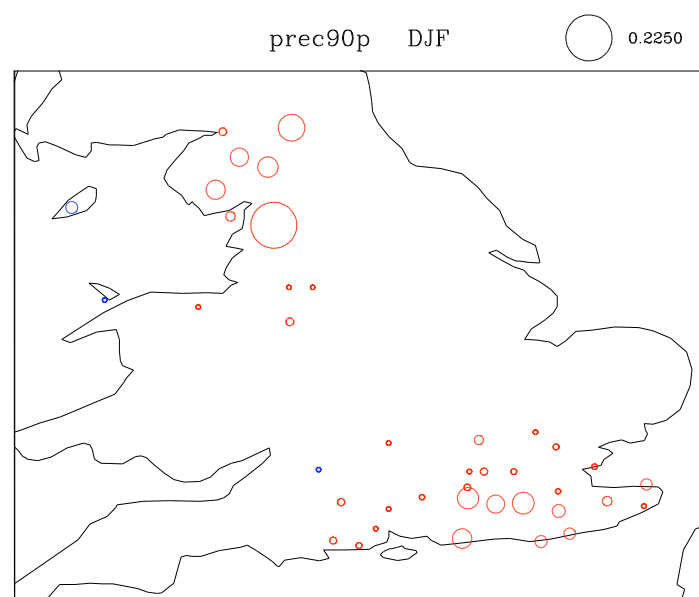


Fig 1: Trends in DJF 90th percentile of daily rainfall.

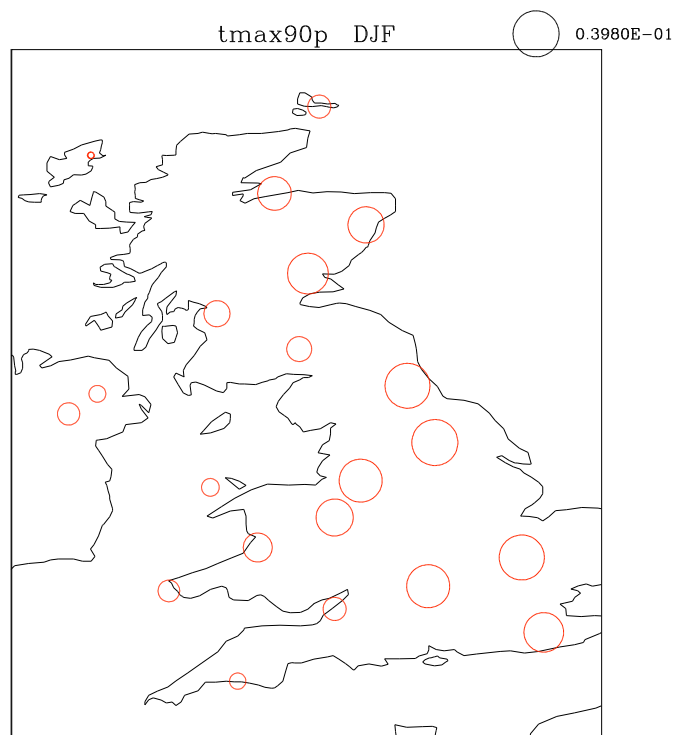


Fig 2: Trends in DJF 90th percentile of daily temperature.